DOCUMENT RESUME

ED 116 813 PS 008 300

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TITLE Is Talking to Baby More Than Baby Talk? A Longitudinal Study of the Modification of Linguistic Input to Young Children.
INSTITUTION Harvard Univ., Cambridge, Mass.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE Apr 75
NOTE 15p.; Portions of this paper were presented at the Biennial Meeting of the Society for Research in Child Development (Denver, Colorado, April 10-13, 1975)

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS Child Language; Imitation; *Infant Behavior; *Language Development; Language Patterns; *Longitudinal Studies; Mothers; *Parent Child Relationship; Parent Role; *Preschool Education; Psycholinguistics; Response Mode; Verbal Development; Vocabulary Development; Word Frequency

ABSTRACT

The significance of three mothers' speech for their infants' language development is considered in a continuing longitudinal study. The study began when the children (two females and one male) were 5 and 6 months of age and will continue until the subjects are 3 years old. In the speech data reported the children were from 6 to 18 months of age. During individual one-hour taping sessions every 3 or 4 weeks, the mother and experimenter talk for about 15 minutes. During the rest of the hour, mothers play and talk naturally with their children. Children's speech appears to correspond to mothers' speech, in terms of complexity of imitated responses and speech patterns. In addition, data show that mothers modify their speech on the basis of linguistic cues from their children. (BRT)

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Is Talking to Baby More than Baby Talk? A Longitudinal Study of the Modification of Linguistic Input to Young Children

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PS 008300

This paper was supported by N.S.F. grant number GSOC-7309150 to Professor Roger Brown. Portions of this paper were presented at the biannual meeting of the Society for Research in Child Development, in Denver, 1975.

"Baby talk" or the idea of a special way of talking to babies is a familiar notion that has even been suggested as a cross-cultural universal. Considerable interest has arisen in the linguistic input provided to the language-learning child as the child has come to be viewed as the active deriver of a language system (Broen, 1972; Gleason, 1973; Snow, 1974). Since it is during infancy, prior to the appearance of speech, that the child must discover the most basic rudiments of language, it is also important to be aware of the nature of the speech to which the infant is exposed.

Recent studies (Snow, 1970; Moerk, 1972; Nelson, 1973; Phillips, 1973;) have shown that mothers' speech to children (usually two to three years old) is less complex in terms of MLU and other measures of syntactic complexity than is speech to adults or older children. One inference from this finding is that talking to babies is the simplest possible form of speech, and that complexity of mother's speech increases linearly with the age of the infant. Another hypothesis is that mothers do not modify their speech at all until their children begin using language.

This paper will present some findings from a study exploring how mothers do in fact speak to pre-linguistic infants and language-learning children. The study investigates the relationship between the linguistic input from the mother and the child's acquisition of language. The data presented here will focus primarily on complexity levels as measured by MLU in morphemes in mothers' speech.

This study is an on-going longitudinal investigation of three mothers' speech to their children: two girls, Elissa and Sadie, and one boy, Justin. It began when all of the children were four months old and will continue until they are three years old. In the data to be reported here, the children were from six to eighteen months of age.

Each mother-child pair was visited at home by this author once a month. A sixty minute tape was made; for 50 minutes the mother played with and talked to the child, for 10 minutes she talked with the experimenter. Data from the mother-experimenter conversation will not be reported here.

The first aspect of the data to be discussed are the changes in mothers' speech from the time the children were 6 months to 18 months old. In terms of MLU in morphemes, changes in mothers' speech did not confirm the hypothesis that complexity increases in a simple linear fashion as the baby grows older. In fact, three distinct trends occurred in each mothers' speech. An example of these trends for one mother is found in the first figure.

Figure 1 here

This figure depicts the changes in Justin's mother's MLU as Justin went from 6 to 18 months of age. Linguistic milestones such as first word, five words and first two-word utterance are indicated according to the first experimental session in which they were observed. Five different words used spontaneously during a session is an arbitrary point set up to indicate the child's level during the one-word stage.

As you can see, the mother's MLU increased from about 3.0 until her child spoke his first word at 11 months. At 12 months, Justin's mother's MLU began to decline and continued to do so until he was 14 months old. The following month, his mother's MLU began to increase again. At fifteen months, Justin reached the 5-word level. Mother's MLU then continued to increase till Justin was 18 months old and used his first two-word utterance, except for one as yet inexplicable drop at 17 months.

Figures 2 and 3 here

As you can see in figures 2 and 3, MLU trends for the other two mothers looked very similar to those for Justin's mother, with the exception of Elissa's mother's seeming anticipation of her first word and an inexplicable decrease prior to the later increase. Sadie's mother's MLU was extremely variable preceding her first word rather than increasing.

Figure 4 here

Figure 4 shows changes in MLU averaged across the three mothers. One point that should also be noted is that, with all the ups and downs, no mother's MLU reached a high of over 4.50 morphemes -- which is still significantly lower than their MLU's of about 7.5-8.0 when speaking to the experimenter. Thus the mothers were definitely modifying their language to their children long before the children spoke, though the degree of modification changed over time.

In summary, speech directed to the children as infants was not as simple as it could have been. Rather, prior to the

children's production of their first words, mother speech was frequently more complex than at later dates. Each mother's speech decreased in complexity at or near the time of her child's first word. One factor in this decrease was the mother's switch from language-teaching strategies which were largely self-directed in nature to more specific elicitations and labels. Since the children began to play a more active part in their interactions, it may have become more difficult for the mothers to talk to themselves through speech addressed to their children.

At some point between the 5-word level and the acquisition of syntax, when all the children were frequently producing one-word utterances, the three mothers' speech began to increase in complexity. It is important to realize that this increase was not obviously associated with a comparable linguistic change for any of the children. It was associated, however, with a matrix of changes in language-teaching strategies and linguistic modifications in mother speech. Tag questions, occasional questions and complex sentence structures increased in frequency. Interrogatives became the dominant form of interaction (as opposed to imperatives and declaratives) for all of the mothers and for the first time wh- questions began to outnumber yes-no questions. The mothers at this time also modified the ways in which they responded to their children's utterances. Mothers' imitations of their children's speech decreased and expansions, corrections and semantic extensions began to occur in each mothers' speech. Mothers' responses will be discussed in more detail later in the paper. In general, these modifications seemed to indicate that the mothers were not only addressing more of their utterances to their children, but that they now expected their children to have something to say in return.

It is interesting to speculate on what will happen after the children have acquired syntax. Any predictions are obviously related to why mothers' MLU began to increase between the 5-word level and the children's acquisition of syntax. One prediction assumes that the increase occurred because the children had become able to understand more complex utterances and able to give their mothers linguistic and behavioral feedback. This feedback allowed the mothers to extend their utterances into greater complexity, knowing the children were capable of understanding them or informing them if they were not understood. Based on this assumption, one would predict that, with greater comprehension skills and given syntax, the children could understand more and provide even better feedback and the complexity level of mother speech would continue to rise.

A second explanation might assume that the increase in complexity was a function of the mothers' beginning attempts to teach relations rather than words. In this case, MLU would

remain stable until the subject of language teaching changed again.

On the other hand, it could be predicted that mother speech might be modified as a result of changes in the nature of the interaction between mother and child. Prior to 18 months, much of the child speech seemed to serve little or no communicative purpose. Rather, speech seemed to function for the children as a kind of object or toy to be played with, or as something to be produced to satisfy their mothers' demands. As the children begin to use words to represent and communicate information to a greater extent, it would be expected that mother-child interaction would begin to be increasingly composed of information-exchange. At this point, it could be predicted that mothers MLU's would drop as they became more involved in talking with their children rather than talking at or teaching them.

One general characteristic of each mother's speech which did not change over the period of this study was the proportion of speech each mother devoted to language-teaching. This is an interesting fact in itself since at 12 or 18 months the children were certainly more ready to produce language than at six months. Three types of utterances have been classified as language-teaching: coaching (say Mama), labelling (this is a cow) and general elicitations (what's that). Each mother produced frequent language-teaching utterances; they ranged from an average of 31 to 45 to 54% of the speech samples for the three mothers. Although the mothers showed similar trends in the changes of their speech, each retained an individual style of language-teaching. Sadie's mother consistently used more coaching and Elissa's mother more general elicitations than the other mothers. Justin's mother responded to his utterances with "metalinguistic feedback" (e.g., "yeah") three times more often than did Sadie's mother (who imitated Sadie frequently) or Elissa's mother (who used many expansions and semantic extensions).

Another interesting characteristic of this data was that these language-teaching utterances were on the average less complex than the total speech sample. An example of this can be seen in figure 2. Elissa's mother's MLU for language-teaching utterances ranged from .25 to .50 morphemes shorter than for her total speech sample for the first eight months of the study. The MLU for language-teaching utterances for the other two mothers was consistently about .50 morphemes less than for their total speech samples.

One important interaction to be considered is the relationship between the utterances which the mothers tried to teach to or elicit from the children and the utterances produced by the children. One way to look at this interaction was to discover which of the mothers' utterances the children imitated.

Imitations were defined as the repetition of all or part of one of the other person's preceding three utterances. The children in this study, like those in previous studies, showed differential rates of imitation which remained in stable rank orders, even though the proportion of imitations in the total speech samples decreased for each child. As measured after the 5-word level where numbers of child utterances had become great enough to provide a less biased statistic, imitations decreased from 24 to 8%, 44 to 32% and 26 to 11% of each child's speech samples. Yet even with these individual differences, all the children imitated a consistently higher proportion of language-teaching utterances than would have been predicted by the proportion of the total speech sample accounted for by language-teaching. Eighty-eight percent of the utterances that Elissa imitated were language-teaching utterances; 92% of Sadie's, and 58% of Justin's imitations were of language-teaching.

However, even though the utterances imitated by the children were frequently language-teaching utterances, the children were very selective in the utterances they imitated. The MLU's for the mother utterances imitated by all three children were substantially shorter than the MLU's for the mother's total speech samples and than the MLU's for language-teaching utterances.

We can see an example of this in figure 2. Not only was the MLU for utterances imitated by Elissa less than the MLU of the other samples (at least prior to Elissa's first 2-word utterance) but MLU for imitated utterances increased steadily. This increase in MLU for imitated utterances occurred when language-teaching utterances were variable in complexity, and the total sample MLU increased only gradually. The finding that imitated utterances were of lower but increasing complexity was true for all mother-child dyads. Imitated utterances were consistently about 1.25 morphemes less than the MLU for the mothers total samples for the first few months after the children began to speak. By the last month of data reported here, MLU's for imitated utterances and the total samples were not noticeably different.

Yet in figure 2 we should note that at 17 months or when Elissa used her first 2-word utterance, the relationships just described disappeared. Language-teaching utterances increased in complexity relative to the average utterance from the mother speech sample. Elissa began to imitate utterances equal to or longer than the average utterance. One possible reason for this change was that the criterion for Elissa's imitations changed from one of length to that of certain semantic or grammatical relations. This finding did not hold for either of the other two children: Sadie did not really begin to combine words during the period of this study, and the utterances Justin imitated by the

time he used syntax were too few to provide meaningful data.

In addition to directly eliciting words, language teaching may also occur through the utterances that a mother makes in response to her child's speech. The utterances coded as responses included only those in which the mother directly replied to or commented upon the child's speech within three utterances. These responses included imitations of the child's utterances, expansions, requests for clarification and occasional questions, corrections, semantic extensions and feedback utterances like "yeah." For all the mothers, responses to the children's utterances were significantly less complex than the average utterance of the mother. An example of this can be seen in the figure 3. The MLU for Sadie's mother's responses to her child's speech was consistently about 1.25 morphemes shorter than the mother's average utterance. Significantly, the mean length of the responses increased over time even when there was no comparable increase in the complexity of Sadie's utterances which were being responsed to. This finding suggests that the mothers were using not only linguistic cues from the children to modify their speech but also some other kind of information.

In summary, there are three inferences that can be drawn about the relationship between linguistic input and language development on the basis of the data presented here. First, we have seen several pieces of evidence to support the contention that children do actively rerespond to different aspects of their linguistic environments. Whether this participation is limited by memory or processing capacity constraints which select for certain kinds of input or whether it is a function of more general strategies of language-learning is not clear. Each of the children selectively imitated simpler than average utterances from his of her mother. For each child, the mother's utterances that were imitated grew steadily more complex even when the MLU for mother's total sample and language-teaching utterances remained stable or increased at a slower rate. Elissa switched from imitating particularly simple utterances to imitating utterances of greater complexity at the same time that she began to produce multi-term utterances. This shift suggested a change in strategy from imitating names of objects and events selected from increasingly lengthy utterances to the imitation of relations. Further analyses may provide us with more clues to the exact nature of the interactions between language-learning and the linguistic environment in which it occurs.

Second, these data have shown that the mothers did modify their speech on the basis of linguistic cues from their children. Yet these language milestones were not the only bases for their modifications. The children's actual or anticipated first utterances did have a significant effect on each of the mothers' speech. However, the fact that the mothers' responses to their

children's utterances grew steadily more complex even when the complexity of the child speech remained stable indicated that the mothers were probably responding to uses other than the children's language development. Further support for this conclusion comes from the finding of an increase in mother's MLU and shift in speech patterns between the children's 5-word level and first use of syntax. These changes occurred without any comparable linguistic changes in the children. This is another example of the mothers' responses to extra-linguistic cues. One avenue to explore would be to look for early indications from the child of his or her awareness of semantic relations or basic concepts that the mothers might be responding to as indices of their children's cognitive development. On the other hand, it is possible that the mothers are not responding to any aspect of the children's behavior at all, but simply to their own expectations or desires for their children's language development.

Finally, we have seen that talking to babies is not a simple process. The three mothers each modified their speech in complex ways as their children developed; modifications which were based to some degree on the children's language and perhaps cognitive abilities. And we have seen evidence that these modifications did, to some extent, achieve their implied purpose, in that the children imitated the least complex utterances and those most oriented to language teaching for much of the study. Toward the end of the period covered by this study, we began to find evidence of both children and mothers getting ready to shift strategies as they went into a new stage of linguistic interaction. It will be interesting to see what happens next.

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Figure Captions

Figure 1. Changes in one mother's mean length of utterance as a function of the child's age and language development.

Figure 2. Changes in one mother's mean length of utterance for total speech sample, language-teaching utterances and utterances imitated by child as a function of the child's age and linguistic competence.

Figure 3. Changes in one mother's mean length of utterance for total speech sample, language-teaching and responses to child's utterances as a function of the child's age and language development.

Figure 4. Average change in mean length of utterance for three mothers' speech as a function of children's age and language development.

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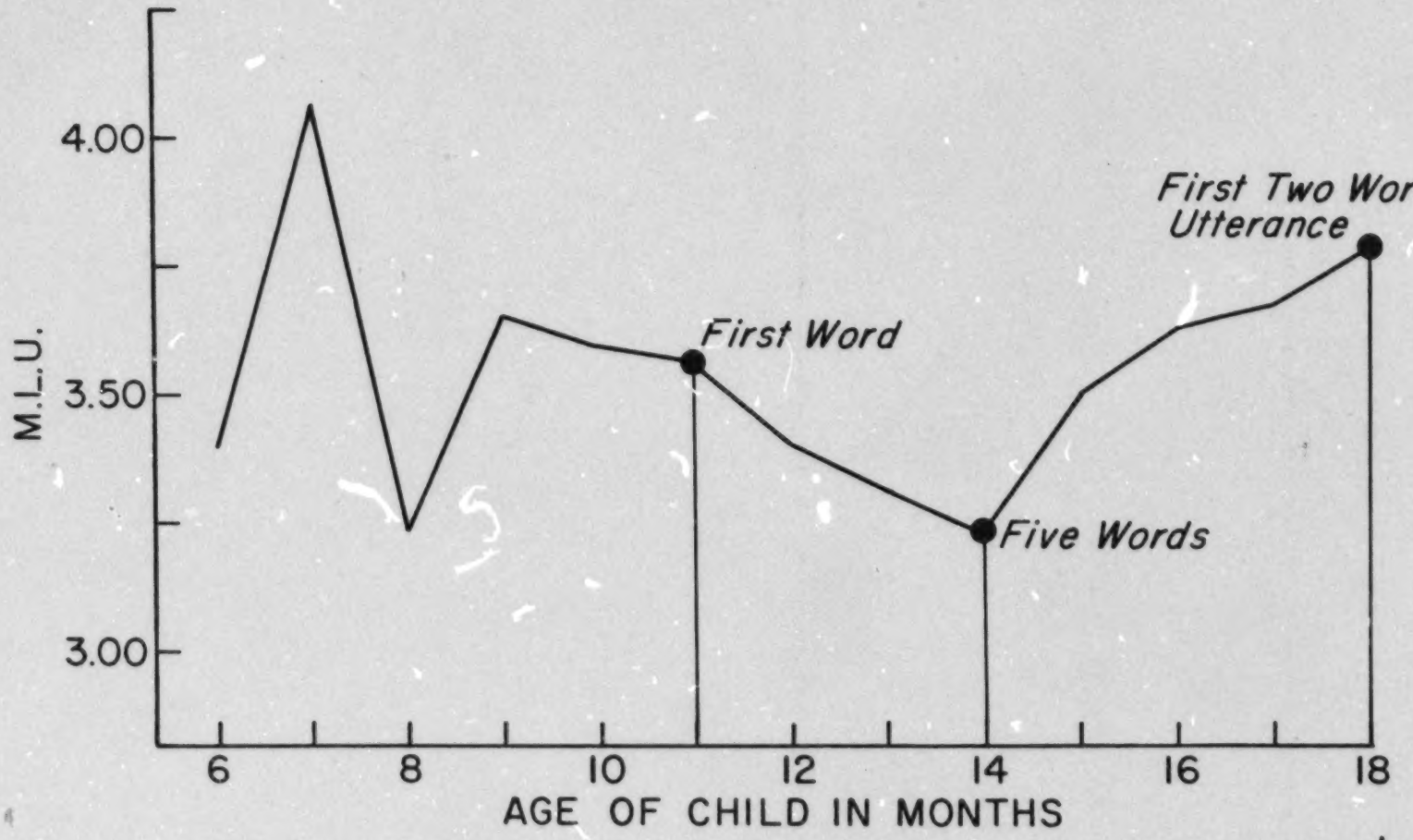
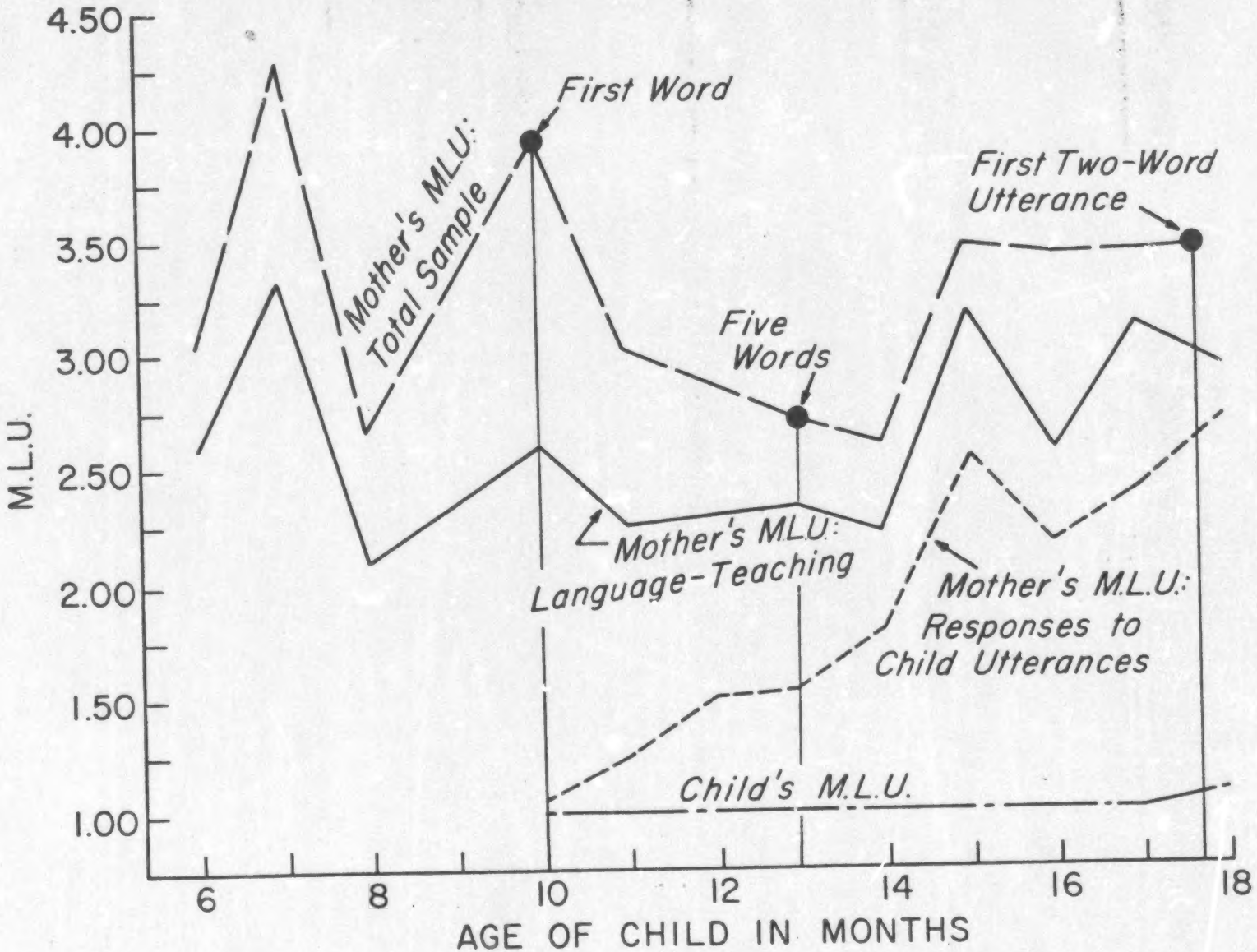


Average change in mean length of utterance for three mothers' speech as a function of children's age and language development.



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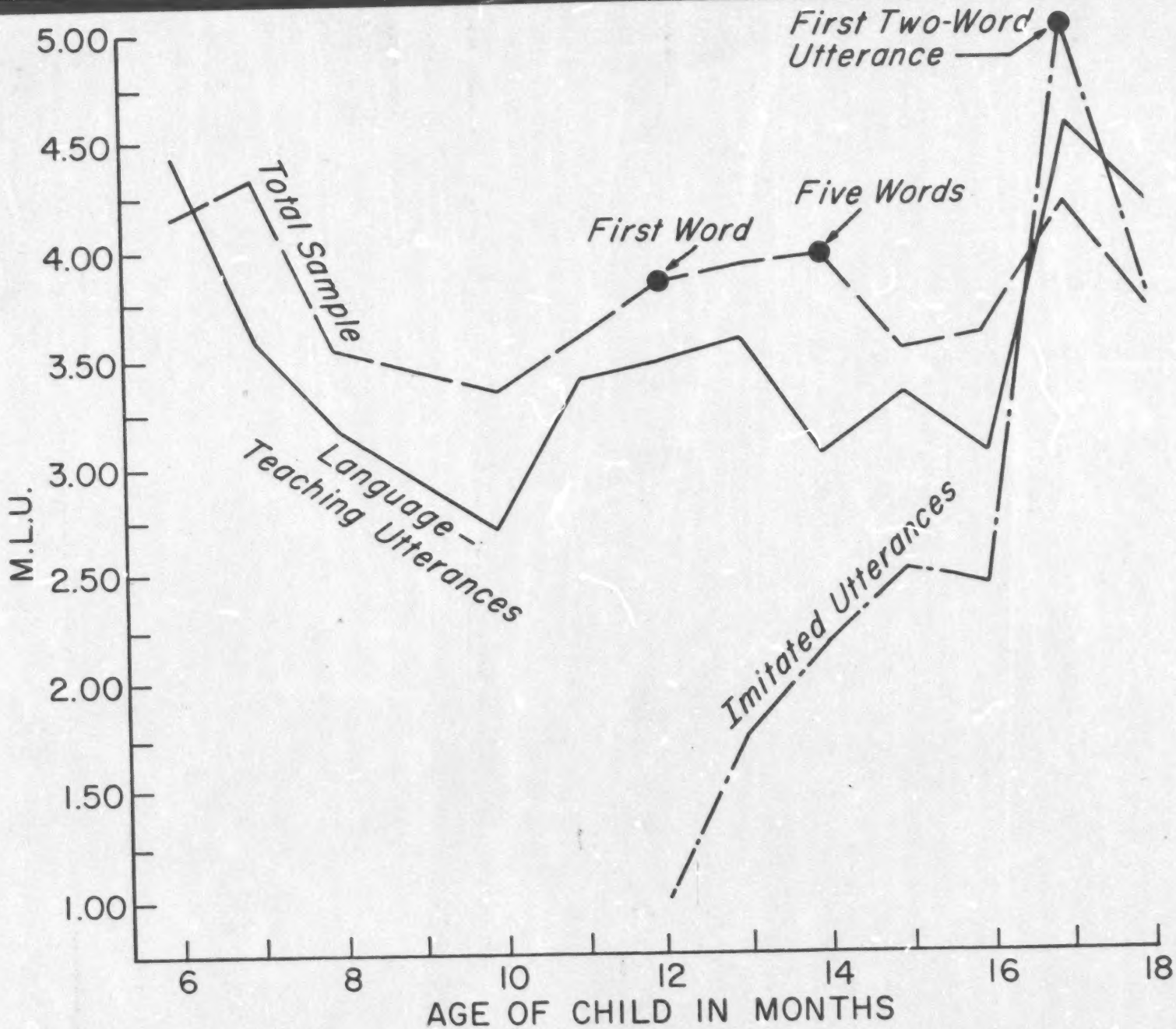
Changes in one mother's mean length of utterance for total speech sample, language-teaching and responses to child's utterances as a function of the child's age and language development.



Changes in one mother's mean length of utterance for total speech sample, language-teaching utterances and utterances imitated by child, as a function of the child's age and linguistic competence.

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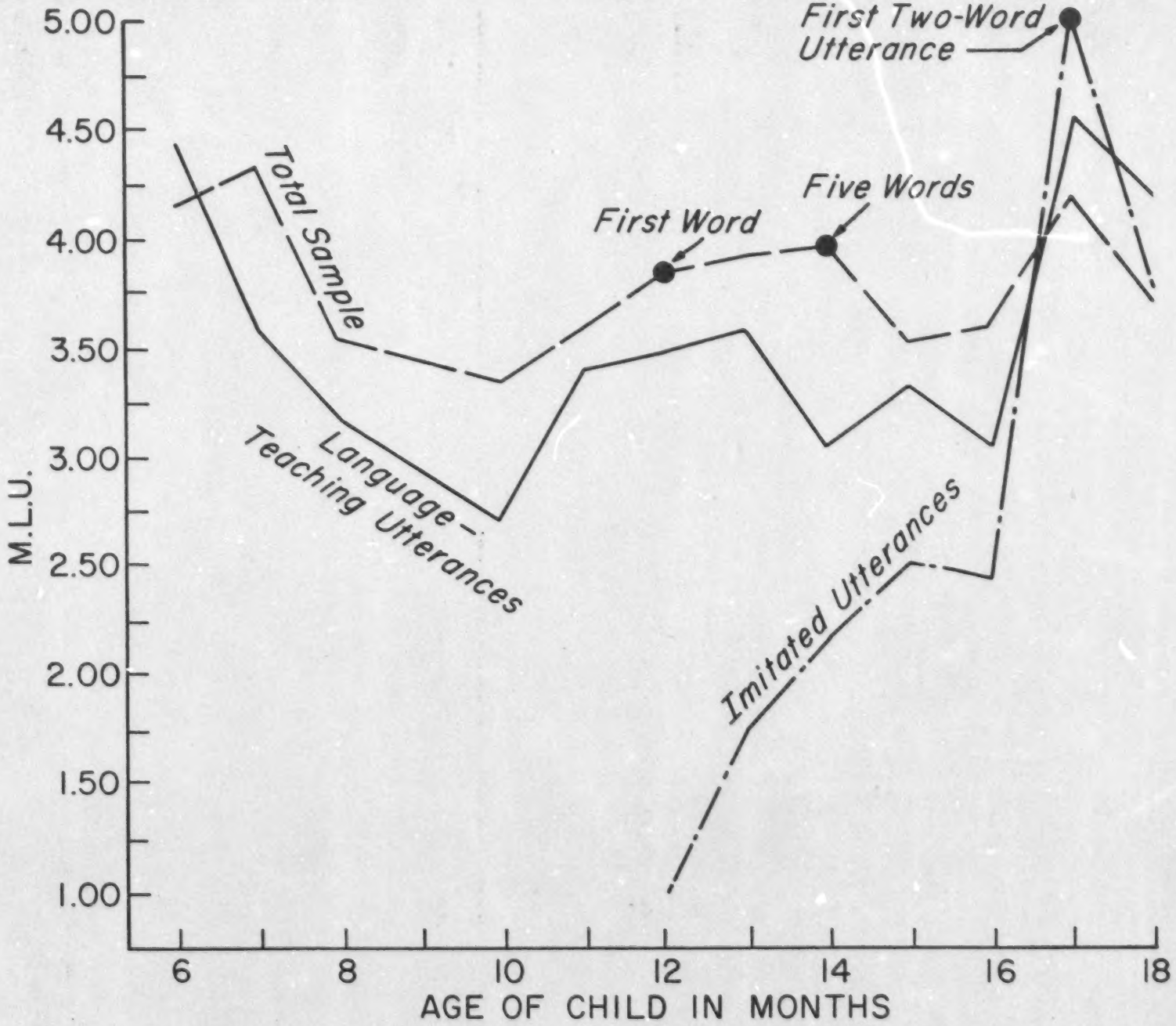

Changes in one mother's mean length of utterance for total speech sample, language-teaching utterances and utterances imitated by child, as a function of the child's age and linguistic competence.